

**EXACT ENGLISH LANGUAGE
TRANSLATION OF THE PCT
APPLICATION AS
ORIGINALLY FILED
WITH ABSTRACT**

DOOR ASSEMBLY

The invention relates to a set of doors for closing off a bay in a wall, comprising a first flexible door and a second door having a rigid bottom edge, it being possible to displace each of these doors in an upward and a downward motion between an open position and a closed position, the second door being arranged so that the bottom edge moves apart from the wall during its upward motion towards the open position, creating a slit between the wall and the bottom edge of this second door.

Said second door is provided in the form of a sectional door, for example, made up of a succession of rigid sections articulated one about the other. When this second door is in its closed position, the sections and the bottom edge of the door fit against the wall, whilst in the open position, a slit is created between the part of the wall located above the bay and the bottom edge of the door.

Currently known sets of doors are of a relatively cumbersome and complex construction. Furthermore, these known sets of doors do not enable a sealed closure to be obtained when the flexible door is in the closed position and said second door is in the open position. In particular, spaces are left, through which insects, an air flow or dust are able to penetrate the enclosure closed off by this set of doors. In practice, it is relatively complicated to make a set of doors which provides satisfactory sealing.

Document US 2 501 454 describes a set of two doors, each of which is wound on a drum to enable them to be opened. An attempt has been made to provide a seal between the wall and the set of these doors by mounting a housing above the bay in which said drums are enclosed. Naturally, mounting such a housing is relatively complex and it is not possible to use such a housing if one of these doors is not wound on a drum. This might be the case, for example, if the second door is a rigid door or a sectional door.

One of the essential objectives of the present invention is to propose a set of doors that is rather less cumbersome and of a very simple construction. Furthermore, this set of doors must offer a very effective and simple way of obtaining complete sealing when one of the

doors of this set is closed.

To this end, the invention proposes a flexible door which is arranged at least partially between said second door and the above-mentioned wall, it being possible to displace this flexible door through said slit between its closed position and its open position when the
5 second door is in the open position.

In one specific embodiment of the set of doors proposed by the invention, when said second door is in its open position whilst said flexible door is being displaced into its closed position or into its open position, the latter, as it is displaced, is supported against a guide surface provided on the wall above the bay and/or at the bottom edge of the second door.

10 In one specific embodiment of the invention, the flexible door has a shutter, the side edges of which are guided relative to guide tracks crossing through said slit between the wall and the bottom edge of the second door.

Advantageously, when said second door is in the open position with said flexible door in its closed position, it is in contact with the wall above the bay and forms a seal between
15 this wall and the flexible door on the one hand and on the other hand is supported against the bottom edge of the second door in order to maintain said contact, thereby providing the aforementioned seal.

For practical purposes, the guide tracks form a seal between the wall and said second door when it is in the closed position.

20 In one practical embodiment of the set of doors proposed by the invention, the bottom edge of the second door is provided with a guide surface enabling the door with the flexible shutter to slide on this edge as the shutter is moved upwards or downwards.

Advantageously, the wall located above the bay is provided with a guide surface, enabling the door with the flexible shutter to slide relative to this wall as the shutter is moved
25 upwards or downwards.

In one very practical embodiment of the set of doors proposed by the invention, the door with the flexible shutter is provided with a sealing element extending substantially across the entire width of the flexible door, which extends between the door and the wall located above the bay when the flexible door is in the closed position, forming a seal between this wall and this

door.

In a practical manner, the flexible door is provided with a sealing element extending essentially across the entire width of the flexible door which, when the flexible door is in the closed position, extends between this door and the bottom edge of the second door so that
5 the flexible door is clamped between the wall and this bottom edge.

Other details and features of the invention will become apparent from the description given below, which is not intended to be restrictive, of various specific embodiments of a set of doors as proposed by the invention, with reference to the appended drawings.

Figure 1 is a diagram in section, showing a set of doors in a first embodiment
10 proposed by the invention, with a sectional door in the closed position and a flexible door in the open position.

Figure 2 is a section through line II-II indicated in figure 1.

Figure 3 is a section identical to that illustrated in figure 1, in which the sectional door is in the open position and the flexible door is in the closed position.

15 Figure 4 is a diagram in section, showing a set of doors in a second embodiment proposed by the invention, with a sectional door in the closed position and a flexible door in the open position.

Figure 5 is a section identical to that shown in figure 4, in which the sectional door is in the open position and the flexible door is in the closed position.

20 Figure 6 is a diagram in section, on a larger scale, along line VI-VI indicated in figure 4.

Figure 7 is a diagram in section, on a larger scale, along line VII-VII indicated in figure 5.

25 Figure 8 is a diagram in section identical to that of figures 6 and 7, in which the flexible door and the sectional door are in the open position.

Figure 9 is a detail showing the part of the set of doors illustrated in figure 4 above the bay.

Figure 10 is a detail showing the part of the set of doors illustrated in figure 5 above the bay.

Figure 11 is a detail of the part above the bay, showing the embodiment of the set of doors proposed by the invention illustrated in figures 4 to 10, in which the flexible door and the sectional door are in the open position.

Figure 12 is a detail of the part above the bay showing the set of doors, in which
5 the flexible door is provided with a flap and is in the closed position.

Figure 13 is a detail of the part above the bay showing the set of doors, in which the flexible door is provided with a thickened section and is in the closed position.

Figure 14 is a very schematic front view of the set of doors proposed as a second embodiment of the invention.

10 Figure 15 is a diagram in section showing a set of doors in another embodiment proposed by the invention, with a sectional door in the closed position and a flexible door in the open position.

Figure 16 is a section along line XVI-XVI indicated in figure 15.

Figure 17 is a section along the line XVII-XVII indicated in figure 15.

15 Figure 18 is a diagram in section of the set of doors illustrated in figures 15 to 17, when the sectional door is in the open position and the flexible door is in the closed position.

Figure 19 is a section along the line XIX-XIX indicated in figure 18.

Figure 20 is a diagram in section showing a set of doors as proposed by the invention, comprising a pivoting door and a flexible door.

20 The same reference numbers are used in the different drawings to denote the same or similar elements.

Generally speaking, the present invention relates to a set of doors for closing off a bay in a wall. This set of doors comprises a first flexible door and a second door, arranged one behind the other, to enable the bay to be closed off by one of these doors when the other door is
25 open.

The use of such a set of doors is particularly practical in situations where said second door is a rigid door, the displacement of which between the closed position and the open position is relatively slow. If there is a relatively high density of people or traffic passing through this bay, opening and closing this rigid door incurs a considerable loss of time since it is necessary

to wait for this rigid door to open. The presence of a flexible door which can be closed and opened at a relatively high speed eliminates this disadvantage. Accordingly, the rigid door is placed in its open position if a relatively high amount of passing traffic is expected and this door is placed in the closed position at night, when no traffic is expected.

5 Using a flexible door has an additional advantage insofar as such a door requires only a relatively small amount of mounting space.

Advantageously, the flexible door has a shutter, the side edges of which preferably co-operate with guide tracks provided at either side of the bay, so that the bay can be closed off by this shutter. The word "shutter" is intended to be construed within the scope of the
10 present invention as meaning any planar element of a slim thickness, which is at least partially pliable, flexible, optionally with one or more transverse stiffeners, such as a canvas, a screen to keep out mosquitoes or other insects, a strip of plastics material, a tarpaulin, a grill or a metal sheet, etc. ...

However, it should be pointed out that particular preference is given to flexible
15 shutters provided in the form of a canvas, for example.

Accordingly, the figures illustrate a shutter consisting of a canvas, the side edges of which are provided with a bead or a succession of small rigid blocks, articulated one about the other.

Figures 1 to 3 illustrate a first embodiment of the set of doors proposed by the
20 invention, comprising a flexible door 1 and a rigid door 2, which can be used to close off a bay 3 in a wall 4.

The flexible door 1 comprises a shutter 9 and two guide tracks 5 and 6 extending on either side of the bay 3, in which the side edges 7 and 8 of the shutter 9 are guided as this shutter 9 is displaced between a closed position and an open position. At a level above the bay 3,
25 a drum 10 is provided, about which the shutter 9 is wound as it is moved into the open position or from which it is unwound as it is displaced into the closed position. Advantageously, driving means are provided for this purpose, although they are not illustrated in the drawing.

The guide tracks 5 and 6 are preferably mounted in an elastic arrangement relative to the wall 4 so that as the shutter 9 is being displaced into the closed position, these

guide tracks 5 and 6 are automatically moved towards one another to ensure that the distance between them corresponds to the width of the shutter 9. When the flexible door 1 is open and the shutter 9 is therefore wound around the drum 10, the guide tracks 5 and 6 automatically recoil so as to be spaced at a distance apart, due to their elastic mounting, so that they are not in the bay 3.

5 The rigid door 2, which is provided as a sectional door comprising a succession of sections 11 articulated one about the other, mainly extends along the flexible door 1 in such a way that the latter is arranged between this rigid door 2 on the one hand and the bay 3 and the wall 4 on the other.

10 At the point where the sections 11 are articulated one about the other, rollers 12 are provided, which are guided in matching guide tracks 13 and 14. These guide tracks 13 and 14 extend substantially vertically on either side of the bay 3, curve on a level with the top part of the bay 3 and then extend transversely relative to the wall 4.

 The guide tracks 5 and 6 of the flexible door 1 are disposed between the guide tracks 13 and 14 of the rigid door 2 and the wall 4.

15 Accordingly, the guide tracks 5 and 6 of the flexible door 1 form a seal between the wall 4 and the rigid door 2 when the latter is in the closed position, as schematically illustrated in figure 2. In particular, when the rigid door is in the closed position, the side edges of the sections 11 are supported against the guide tracks 5 and 6 of the flexible door 1, preferably slightly compressing these guide tracks 5 and 6, which are made from a slightly elastic material.

20 When the flexible door 1 is in the open position, the bottom edge 16 of the shutter 9 is disposed above the bay 3 between the top section 11 of the rigid door 2 and the wall 4, thereby forming a seal between the rigid door and the wall 4 located above the bay 3. In particular, the bottom edge 16 of the shutter 1 is clamped between the wall 4 and the corresponding section 11 of the rigid door when the latter is in its closed position. For this reason,
25 the bottom edge 16 of the shutter 1 preferably has an elastic bead extending across substantially the entire width of the shutter 1.

 As the rigid door 2 is opened, the bottom edge 17 of this door is moved slightly away from the wall 4 so that the shutter 9 of the flexible door can be readily displaced through the slit 31 thus created between the wall 4 and the bottom edge 17 of the rigid door 2. This slit 31

therefore appears only when the rigid door 2 is open and is not present when this door is closed.

When the rigid door 2 is in the open position and the flexible door 1 is in the closed position, it is important that the latter should be in a position to provide a sealed closure of the bay 3. To this end, the part of the shutter 1 extending in the region of the bottom edge 17 of the rigid door, when the latter is in the open position, can be supported against this bottom edge 17. This therefore prevents any space from being formed between the shutter 9 and the wall 4 above the bay 3. Such a space might be produced if the shutter 9 were moved away from the wall 4 above the bay 3 when subjected to a flow of air or slight pressure, for example.

In order to ensure that the shutter 9 remains in permanent contact with the wall 4 above the bay 3 when the flexible door is in the closed position, a guide surface is advantageously provided on this wall 4, extending across substantially the entire width of the shutter 1. This guide surface is provided in the form of a thickened section 18, for example, disposed at the point above the bay 3 where the shutter 1 comes into contact with the wall 4. Consequently, this thickened section on the one hand ensures that the shutter 9 slides with a minimum of friction as the shutter is being closed or opened and on the other hand provides a seal between the shutter 9 and the wall 4.

Similarly, a guide surface may be provided on the bottom edge 17 of the rigid door 2, to enable the shutter 9 to slide on this bottom edge 17 as the shutter 9 is moved down or up.

Figures 4 to 11 illustrate a second embodiment of the set of doors proposed by the invention, with a conventional sectional door and a flexible door 1, in which the guide tracks 5 and 6 of the latter are mounted in the bay 3. This is illustrated in figures 6, 7 and 8.

The guide tracks 5 and 6 of the flexible door specifically comprise a profiled section with two parallel flanges linked to one another in their longitudinal direction by a central cross-piece, this section thus having a H-shaped cross section. The edges of one of the flanges are bent towards the facing edges of the other flange so as to form two channels 19 and 20. The corresponding edge 7 or 8 of the shutter 9 can be displaced in one of these channels 19 during opening or closure of the flexible door 1 whilst a mounting strip 21 is fixed in the other channel 20.

This mounting strip 21 is mounted in the bay 3 on the wall 4. As illustrated in the drawings, the mounting strip 21 has side edges 22 and 23 which are thicker than the part of the strip 21 disposed between these edges 22 and 23. The mounting strip 21 is mounted in the region of an edge 23 on the wall in the bay 3 by means of a mounting batten 24 so that the mounting strip 21 is clamped between the mounting batten 24 and the wall 4. The other edge 22 of the mounting strip 21 is retained in the corresponding channel 20 of said section.

The mounting strip 21 is made from a flexible and preferably elastic material, such as an elastomer, polypropylene or polyurethane. Said section is preferably made from a relatively flexible material to enable this section to bend and flex slightly and maintain a uniform tension on the shutter.

When the flexible door 1 and the rigid door 2 are open, as illustrated in figure 8, the mounting strip 21 is extended so that it is located outside the bay 3.

When the flexible door 1 is being closed by the downward movement of the shutter 9, the width of which is shorter than the width of the bay 3, the sections at the two sides of the bay 3 are gradually moved closer to one another, flexing the corresponding mounting strips 21. This is illustrated in figure 7. Given that the mounting strips 21 have a tendency to extend, the shutter 9 always remains substantially taut when it is in the closed position.

When the flexible door 1 is being closed by the upward movement of the shutter 9, the mounting strips 21 gradually resume their extended position, as illustrated in figure 8.

When the flexible door 1 is open and the rigid door is in the closed position, as illustrated in figure 6, the mounting strip 21 is flexed and is supported, with said section, against the surface of the sections 11 of the rigid door 2. The mounting strip 21 and this section therefore form a seal between the wall 4 and the rigid door 2.

Figures 5 and 10 illustrate the set of doors proposed by the invention, with the rigid door in the open position and the flexible door in the closed position. The bottom edge 17 of the rigid door 2 is provided with a guide surface in the form of a cylinder 25, which may optionally undergo a rotation about its axis, and which extends along this bottom edge 17 across a distance substantially corresponding to the width of the shutter 9. In a practical manner, this cylinder 25 is provided in the form of a succession of coaxial rollers. This guide surface enables

the shutter 9 to slide against this bottom edge 17 of the rigid door 2 with minimum friction as the shutter 9 is moved into its closed position or open position.

In addition, the shutter 9 is supported against this guide surface, or in particular against the cylinder 25, when it is closed, preventing a space from being formed between shutter 9
5 and the part of the wall 4 located above the bay 3.

This part of the wall 4 located above the bay 3 is also provided with a guide surface in the form of a cylinder 25, on which the shutter 9 is able to slide as it is displaced into the closed or open position.

In order to ensure that a seal is provided between the shutter 9 and the bottom
10 edge 17 of the rigid door 2 on the one hand and the wall 4 located above the bay 3 on the other, the shutter 9 is provided with a sealing element 26. This sealing element 26 extends substantially across the entire width of the shutter 9 at the point of the latter facing the bottom edge 17 of the rigid door 2 when the latter is in its open position and the flexible door 1 is in the closed position.

Accordingly, this sealing element 26 is clamped between the bottom edge 17 of
15 the rigid door and the part of the wall 4 above the bay 3, thus providing the desired seal.

The sealing element 26 may be provided in the form of a compressible flap 27, as illustrated very schematically in figure 12. This flap 27 flattens out as the shutter 9 is wound on the drum 10 in order to open the bay 3 and reverts to its initial shape as the shutter is unwound from the drum 10 into its closed position.

Figure 13 illustrates an alternative embodiment of the sealing element 26. The
20 sealing element specifically consists of a bead 28 made from an elastic material, which is clamped between the wall and the bottom edge of the second door when the latter is in the open position, whilst said flexible door is in its closed position.

To enable the shutter 9 to be displaced in an upward and downward movement,
25 driving means are provided, consisting of a rack wheel 29 co-operating with a rack 30 extending along the side edge of the shutter, as illustrated very schematically in figure 7. The rack wheel 29 is located above the guide tracks 13 and 14 of the rigid door 2 and is controlled by an electric motor, not illustrated.

The guide tracks 5 and 6 of the flexible door 1 extend as far as the region in the

vicinity of this rack wheel 29. Since the width of the shutter 9 is shorter than the distance between the guide tracks 5 and 6 by which the shutter 9 is guided, these guide tracks 5 and 6 are slightly twisted together in the region between the bay 3 and the rack wheel 29 when the flexible door 1 and the rigid door 2 are in their open position. The bottom part of the shutter 9 and the bottom
5 edge 16 are always retained in the guide tracks 5 and 6. This is schematically illustrated in figures 11 and 14. The dotted-dashed lines in figure 14 specifically illustrate the path of the guide tracks of the flexible door 1, whilst the bay 3 is indicated by broken lines.

As the flexible door 1 is being opened, the shutter 1 can be wound on the drum or the shutter 9 may be extended above the horizontal part of the guide tracks 13 and 14 of the rigid
10 door, as illustrated very schematically in figures 4 to 11.

In a very practical manner, the set of doors proposed by the invention may be set up using an existing door with at least one rigid bottom edge. For example, if a sectional door is provided in front of a bay, it is possible to mount a flexible door between this existing door and the wall. In particular, when an upward movement is imparted to the sectional door to bring it into
15 its open position, this sectional door moves away from the wall, thus creating a slit between the wall above the bay and the bottom edge of the door in its open position. This slit is generally of a width in the order of 1 to 4 cm.

The set of doors proposed by the invention is then set up by mounting two guide tracks for the flexible door on either side of the bay, extending through said slit between the
20 bottom edge of the sectional door and the part of the wall located above the bay. A drum for winding a shutter is mounted on the wall above the bay, for example, so that the shutter can be displaced through said slit between a closed position and an open position when the sectional door is in the open position.

Accordingly, a flexible door is mounted, which co-operates with the sectional
25 door, maintaining the original height of the passage underneath the sectional door when the latter is in its open position.

Figures 15 to 19 illustrate such a set of doors. As illustrated in figures 15 and 16, when the sectional door 2 is in the closed position, it extends against the wall 4 around the bay 3, forming a seal between this wall 4 and the sectional door 2. As the sectional door 2 is moved

upwards into the open position, the sections 11 of this door gradually move away from the wall 4. Consequently, as explained above, a slit 31 is created between the wall 4 and the bottom edge 17 when the sectional door is in the open position, as illustrated in figures 17 and 18.

5 The flexible door 1, comprising a shutter 9 in the form of a canvas, is mounted between the sectional door 2 and the wall 4 so that the guide tracks 5 and 6 of the flexible door 1 extend through said slit 31 and is displaced through the slit 31 as the shutter 9 is moved upwards or downwards between its closed position and its open position.

In the embodiment of the invention illustrated in figures 15 to 19, the guide tracks 5 and 6 of the flexible door 1 are mounted in the same manner as described with reference to
10 figures 4 to 11.

When the sectional door 2 is in its closed position, the top section 11' of this door is slightly inclined relative to the wall 4. Accordingly, a space is formed between the wall 4 and this top section 11', through which the guide tracks 5 and 6 of the flexible door 1 extend.

At the top edge 33 of the top section 11', a flexible seal 32 is provided, extending
15 along this section 11' between the latter and the wall 4 when the sectional door 2 is in its open position. When the sectional door 2 is closed, this seal is elastically deformed at the point where the guide tracks 5 and 6 of the flexible door 1 pass through the space between the wall 4 and the sectional door 2, as schematically illustrated in figure 17. Accordingly, a seal is obtained between the top section 11' of the sectional door 2 and the wall 4, even though the guide tracks 5 and 6 of
20 the flexible door 1 are disposed between this section 11' and the wall 4.

Naturally, the top section 11' need not necessarily be inclined relative to the wall 4 when the sectional door 2 is in the closed position. For example, a cutout may be provided in this top section 11' or in the wall 4 in the region of the guide tracks 5 and 6 of the flexible door 1 where the latter are accommodated when the sectional door 2 is in its closed position.

25 Since the slit 31 between the wall 4 and the bottom edge 17 of the sectional door 2 is used to guide the shutter 9 of the flexible door 1, the driving means, comprising a drum 10, for the flexible door 1 may be mounted above the sectional door 2. Accordingly, the original height of the passage through the bay 3 underneath the sectional door 2 is not reduced by mounting a flexible door as proposed by the invention.

Figure 20 illustrates another embodiment of a set of doors as proposed by the invention. This set of doors comprises a flexible door 1 and a rigid door 2, consisting in particular of a conventional pivoting door such as used to close a garage, for example. When this rigid door 2 is closed, it conforms to the wall 4 in the bay 3 in a sealing arrangement, whereas when this rigid door 2 is open, as illustrated in figure 20, a slit 31 appears between the rigid bottom edge 17 of the latter and the part of the wall 4 located above the bay 3.

Guide tracks 5 and 6 are mounted in the bay 3 and extend through said slit 31. When the shutter 9 of the flexible door 1 is displaced between the open position and the closed position, the latter is supported against the bottom edge 17 of the rigid door 2 and against the wall 4 above the bay 3. Accordingly, the shutter 9 is guided through the slit 31.

In an alternative embodiment of the set of doors proposed by the invention, a flexible sealing flap is provided, which is mounted along the rigid bottom edge 17 of the second door 2. When the second door is in the open position, this flap seals the slit 31 between the rigid bottom edge 17 and the wall 4. As the shutter 9 of the flexible door 1 is moved downward into its closed position, this flap is flexed due to the action of the bottom edge 16 of the shutter 9 so that the latter is guided between the wall 4 and the flap.

When the second door is in the closed position, the flap forms the seal between the bottom edge 17 of this door and the ground.

Naturally, the invention is not limited to the embodiments described above and illustrated in the appended drawings and other variants would be conceivable without departing from the scope of the present invention.

For example, the aforementioned profiled section and the mounting strip 21 may be an integral piece.

Although the embodiments described all relate to a set of doors with a first flexible door and a second door provided as a sectional door or pivoting door, it is clear that this second door may be a door of any type having a rigid or semi-rigid bottom edge. In particular, this second door might be a flexible door with a rigid bottom edge, for example.

Under certain circumstances, the guide track 5 or 6 of the flexible door may be provided in the form of a bead, around which the corresponding side edge 7 or 8 of the shutter 9

conforms.